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FIGs. 6A – ^{6C}~~6B~~

schematically illustrate illumination units that include different numbers of side reflectors according to principles of the present invention;

FIGs. 7A and 7B schematically illustrate another embodiment of an illumination unit according to principles of the present invention;

5 FIGs. 8A-8C show schematic cross-sectional views of embodiments of illumination units that include solid side reflectors according to principles of the present invention;

FIG. 9 schematically illustrates a cross-sectional view of an illumination unit that includes multiple side reflectors according to principles of the present invention;

10 FIG. 10A schematically shows a perspective view of an illumination unit that includes multiple paraboloidal side reflectors according to principles of the present invention;

FIGs. 10B and 10C present calculated radiation patterns that are emitted from different embodiments of the illumination unit of FIG. 10A;

FIG. 11A and 11B show schematic perspective views of experimental side reflector illumination units according to principles of the present invention;

15 FIG. 12A schematically illustrates a cross-sectional view through a reflective, on-axis collector used in modeling collector efficiency; and

FIG. 12B schematically illustrates a light illumination unit having a reflective, on-axis light collector with four reflectors used in modeling collector efficiency.

20 While the invention is amenable to various modifications and alternative forms, specifics thereof have been shown by way of example in the drawings and will be described in detail. It should be understood, however, that the intention is not to limit the invention to the particular embodiments described. On the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

25 Detailed Description

The present invention is applicable to optical systems and is more particularly applicable to light collection and management systems useful for illuminating a target with light from one or more light emitting diodes (LEDs).